ITEMS UNDER TESTS	
Descrizione *Description*	Display used for information system
Modello base *Basic Model type*	Compact TFT 32" Outdoor Code 993201900100
Modelli derivati *Derived Models type*	D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z0 D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z1
Identificativo interno *Storage No.*	190883 (sampled by customer)
Richiedente *Applicant*	Aesys S.p.A.
Indirizzo *Address*	Via Pastrengo, 7/C I-24068 Seriate (BG) - Italia
Prove effettuate presso *Test carried out by*	TÜV Rheinland Italia Srl Via E. Mattei, 3 – 20010 Pogliano Milanese (Italy)
Norme di riferimento *Reference Standards*	**Partial tests according to ETSI EN 301 908-13 V.11.1.2 (par. 4.3.4 – Transmitter spurious emissions)**
Scopo delle prove *Scope of the tests*	To verify the compliance with the following clauses of reference standards • See summary of testing *TEST SUMMARY* section
Risultati di prova *Test Results*	**COMPLIANT**

Data ricevimento campioni *Date of samples receiving*	30/09/2019		
Data inizio prove *Date of tests start*	01/10/2019	**Data fine prove** Date of tests end	23/10/2019
Rapporto composto da *Test report composed by*	34 Pages		

Provato da / Tested by *(name + signature)*	**Approvato da / Approved by** *(name + signature)*
Andrea Bortolotti (*Laboratory Technician*)	Roberto Radice *(Reviewer)*

The results referred in this report are only relevant to the samples tested and described in this report.
Only complete reproduction of this test report is permitted without written authorisation of TÜV Rheinland Italia.
Compliance with test requirements recorded in this technical report does not give presumption of compliance to all requirements by reference standard.

TRI refuses any responsibility about information supplied by the customer contained in this test report

RELEASE CONTROL RECORD		
TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
28118771 006	Original release	20/10/2020

OGGETTO SOTTOPOSTO A PROVE / *ITEM UNDER TEST*

Descrizione *Description*	Display used for information system
Marca *Brand*	aesys
Costruttore *Manufacturer*	Aesys S.p.A.
Modello base *Basic Model / Type reference*	Compact TFT 32" Outdoor Code 993201900100
Dati di targa *Ratings*	
Classificazione *EUT classification*	---
Massima frequenza di clock *Maximum clock frequency*	---
Installazione *Standing*	Wall / Ceiling / Embedded / Pole support

PRODUCT DESCRIPTION

This display can be part, with any other panels similar or of different types, of a system aimed at informing users in transit on rail vehicles of information to travelers on the railway lines, or general information.

Mechanical	
Size:	TFT 32"
Dimensions:	836 (L) x 530 (H) x 160 (D) mm
Estimated Weight	45Kg

Finish Front :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Finish Rear :	Aluminum, RAL Range, 50% GLOSS, not reflecting MAT, powder coating		
Protection grade:	IP55		
Front protection:	Antireflective (both side) Laminated Tempered glass with UV and IR protection (compliance to IK08 5J according to the EN62262)		
Lock system:	Hinged door, polyurethane bi-component vulcanized gasket; Special anti-vandal locks		
Interfaces:	1x Power Supply 1x RJ45 Data Line 1x M6 Additional ground interface 3x SMA connector (for Wireless 2G/3G/4G version, RF antenna & Wifi) 1x Audio Output (for further details see the attached mechanical drawing)		
Fixing points:	Monitor : Vesa standard 200x200mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)	Monitor : Vesa standard 400x400mm, 4xM8 Female closed holes (for further details see the attached mechanical drawing)
Other:	Mechanical housing compliant to IK10 20J according to the EN62262		

Electrical	
Size	TFT 32"
Input power supply voltage:	Nominal 220-240V$_{AC}$
	Range: 198V$_{AC}$ ÷ 264V$_{AC}$
Input power supply frequency range:	50/60Hz
Protections:	Overload, overvoltage, over temperature
Power Consumption:	Typ.: 130W (@Brightness 70%)
	Max.: 165W (@ Brightness 100%)
	Max.: 325W (@ Brightness 100%, Heating ON)

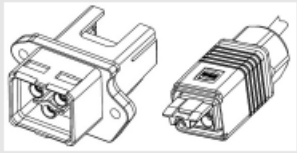
Environmental	
Operating temperature:	-25° ÷ 50° C when installed with Suncover / Sunshade
Thermal management:	At high temperature: - Automatic TFT-LCD matrix brightness linear derating down to maximum 50% with the increase of the environmental temperature - TFT-LCD matrix and PC switched OFF when the highest temperature limit is reached
	At low temperature: - display is switched off when the lowest temperature limit is reached
Operating humidity:	10 % ÷ 95 % R.H. without condensation
Storage temperature:	-20° ÷ 60° Celsius – Ambient temperature 10% ÷ 95% - R.H. at this conditions: - till +40°C @90% R.H. - till +50°C @60% R.H. - till +60°C @40% R.H.
Cooling system:	Direct air exchange with the outside by special filter
Heating system:	Installed
Temperature Sensor	Installed
Light Sensor	Installed
Acceleration Sensor	*Upon request*

Data Communication	
Type of communication:	Copper LAN Ethernet 10/100/1000 Base TX
Protocol type:	Different protocol types supported (according to the software player hosted), SNMP protocol for diagnostic data
Other:	*Upon request:* *- Built-in LAN Ethernet 10/100/1000Base TX to 10/100/1000Base FX Media converter (multimode)* *- Wireless 2G/3G/4G* *- Wi-fi* *(for further details refer to the commercial offer)*

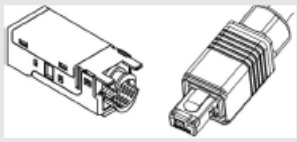
Connectors	
Power supply:	1x Harting PushPull Power 2/0, panel feed-through and connector, 3-poles (2+PE)
Data line:	1x Harting PushPull RJ45 Technology, RJ45-panel jack feed-through
Audio output:	1x Cable Gland
Antenna:	3x SMA Connector
Ground interface:	1x M6 male ground point

Optical specifications (matrix module)	
Size:	TFT 32"
Format:	16:9
Type:	Normally black
(*) Active area:	698.4 (H) x 392.85 (V) mm
(*) Pixel pitch:	0.36375 x 0.36375 mm x RGB
Pixel format:	1920 (H) x 1080 (V) (Native resolution)
Colour depth:	16.7M colors
Luminance:(on white colour)	1.000 cd/m^2 (typ.) @ Center point
Contrast ratio:	4000 : 1 typ. (with dimming)
Viewing angle (CR > 10):	R/L 178° (typ.) – U/D 178° (typ.)
Response time:	8ms (Typ., Grey-to-Grey)
Backlight Technology:	LED

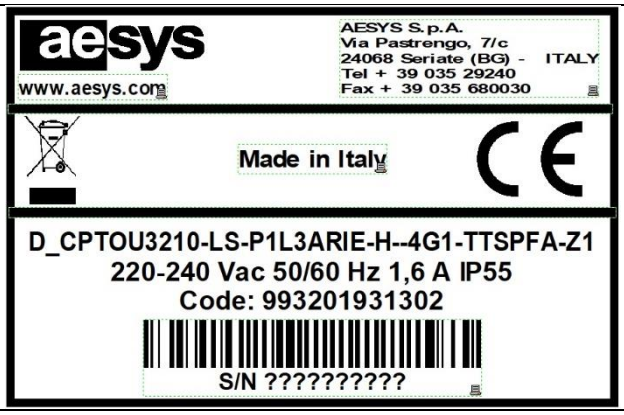
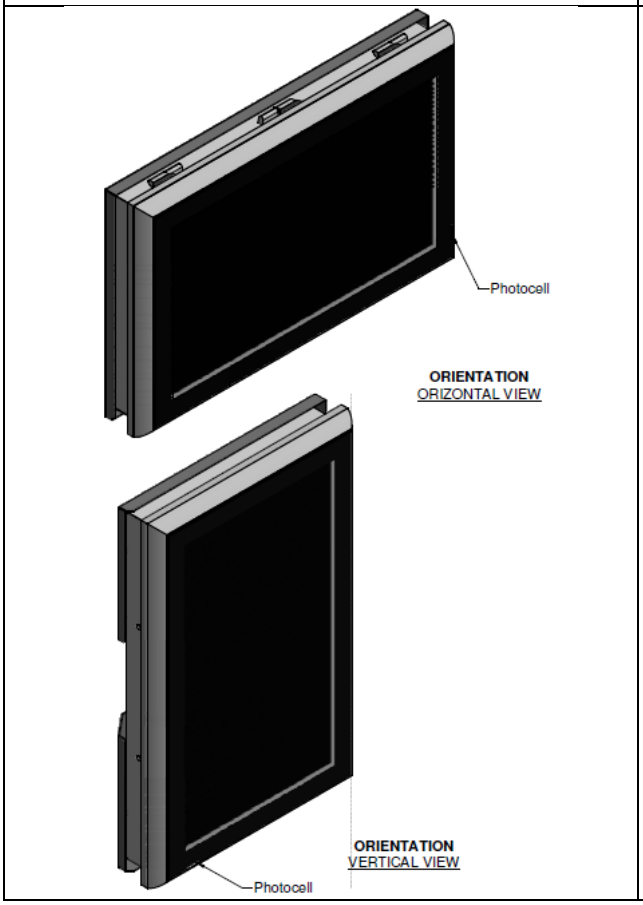
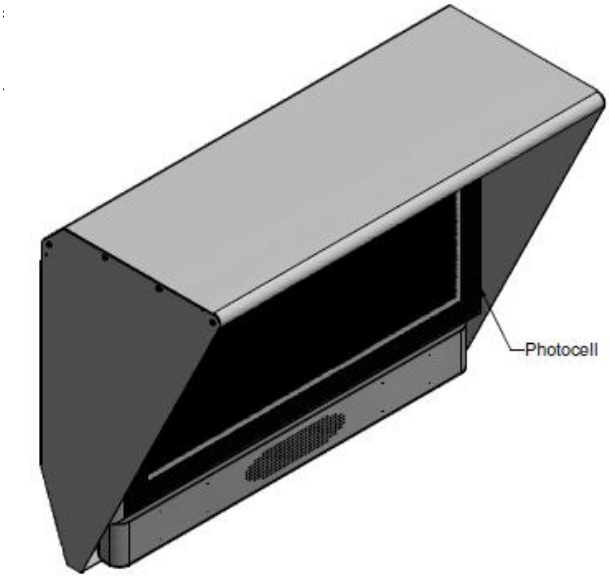
Power Supply

Connector Type	Pin #	Signal	Description
 Harting Push pull V4 Power plug	1	L	Line 230Vac power input
	2	N	Neutral 230Vac power input
	3	GND	Ground

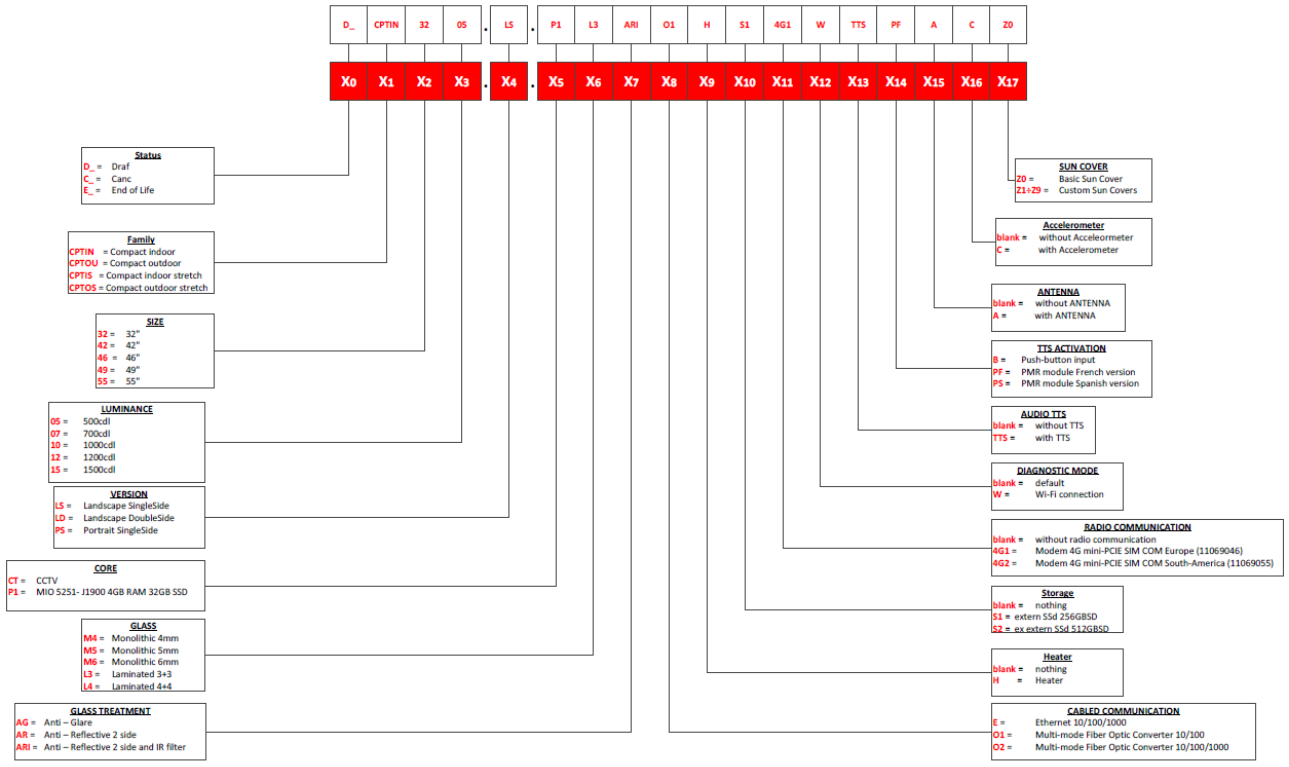
Ethernet data line

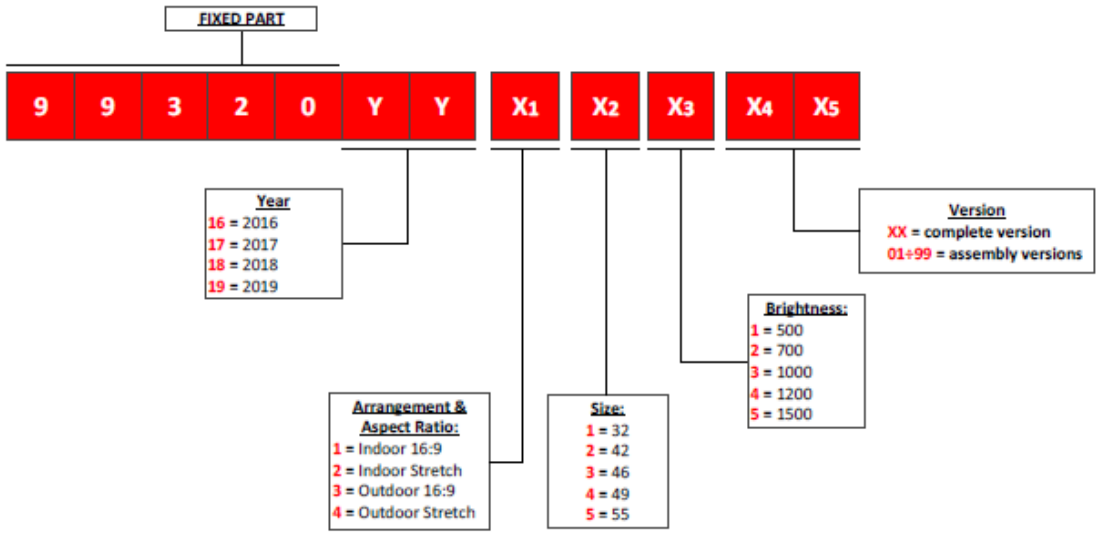
Connector Type	Pin #	Signal	Description
 Harting Push pull V4 RJ45	1	TX+	Transmit Data +
	2	TX-	Transmit Data -
	3	RX+	Receive Data +
	4	BI_DC+ (GHz)	DC+ for GBe
	5	BI_DC- (GHz)	DC- for GBe
	6	RX-	Receive Data -
	7	BI_DD+ (GHz)	DD+ for GBe
	8	BI_DD- (GHz)	DD- for GBe

Derived model(s)

D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z0	D_CPTOU3210-LS-P1L3ARIE-H- - 4G1-TTSPFA-Z1
	
Commercial name	Sun cover
	

Speaking code


D_ CPTIN 32 05 . LS . P1 L3 ARI O1 H S1 4G1 W TTS PF A C Z0
X0 X1 X2 X3 . X4 . X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17
Status
D_ = Draf
C_ = Canc
E_ = End of Life
Family
CPTIN = Compact indoor
CPTOU = Compact outdoor
CPTIS = Compact indoor stretch
CPTOS = Compact outdoor stretch
SIZE
32 = 32"
42 = 42"
46 = 46"
49 = 49"
55 = 55"
LUMINANCE
05 = 500cdl
07 = 700cdl
10 = 1000cdl
12 = 1200cdl
15 = 1500cdl
VERSION
LS = Landscape SingleSide
LD = Landscape DoubleSide
PS = Portrait SingleSide
CORE
CT = CCTV
P1 = MIO 5251- J1900 4GB RAM 32GB SSD
GLASS
M4 = Monolithic 4mm
M5 = Monolithic 5mm
M6 = Monolithic 6mm
L3 = Laminated 3+3
L4 = Laminated 4+4
GLASS TREATMENT
AG = Anti – Glare
AR = Anti – Reflective 2 side
ARI = Anti – Reflective 2 side and IR filter
SUN COVER
Z0 = Basic Sun Cover
Z1÷Z9 = Custom Sun Covers
Accelerometer
blank = without Acceleormeter
C = with Accelerometer
ANTENNA
blank = without ANTENNA
A = with ANTENNA
TTS ACTIVATION
B = Push-button input
PF = PMR module French version
PS = PMR module Spanish version
AUDIO TTS
blank = without TTS
TTS = with TTS
DIAGNOSTIC MODE
blank = default
W = Wi-Fi connection
RADIO COMMUNICATION
blank = without radio communication
4G1 = Modem 4G mini-PCIE SIM COM Europe (11069046)
4G2 = Modem 4G mini-PCIE SIM COM South-America (11069055)
Storage
blank = nothing
S1 = extern SSd 256GBSD
S2 = ex extern SSd 512GBSD
Heater
blank = nothing
H = Heater
CABLED COMMUNICATION
E = Ethernet 10/100/1000
O1 = Multi-mode Fiber Optic Converter 10/100
O2 = Multi-mode Fiber Optic Converter 10/100/1000



RADIO MODULE - - TECHNICAL DATA DECLARED BY THE MANUFACTURER

Simcom SIM7100E

General features	**Specifications for Data transfer**
Five-Band FDD-LTE B1/B3/B7/B8/B20 Dual-Band TDD-LTE B38/B40 Dual-Band UMTS/HSDPA/HSPA+ B1/B8 Dual-Band GSM/GPRS/EDGE 900/1800 MHz Control Via AT Commands Supply voltage range: 3.4V~ 4.2V Operation temperature: -40℃ to +85℃ Dimension: 30 X 30X 2.9 mm Weight: 5.8g GNSS: gpsOne Gen 8B;standalone;assisted,XTRA;	LTE •Uplink up to 50Mbps •Downlink up to 100Mbps HSPA+ •Uplink up to 5.76 Mbps •Downlink up to 42 Mbps UMTS •Uplink/Downlink up to 384Kbps EDGE Class: •Max. 236.8Kbps(DL),Max. 236.8Kbps(UL) GPRS •Max. 85.6Kbps(DL), Max. 85.6Kbps(UL) CSD •GSM data rate 14.4Kbps •WCDMA data rate 57.6Kbps •WCDMA 64kbps CSD for Video call
Other features	**Interfaces**
USB Driver for Microsoft Windows2000/XP/Vista/7/8 USB Driver for Windows CE/Mobile USB Driver for Linux /Android RIL supporting for Android/Windows CE/Mobile Automatic installation for windows Linux API SDK Firmware update via USB TCP/IP/IPV4/V6 Multi-PDP,MT PDP FTP/FTPS/HTTP/HTTPS/SMTP/POP3/DNS/MMS DTMF Gobi SDK to the Win7/Win8/Linux MBIM to Win8 Source code of the PC manager of the device for reference	USB2.0 UART SIM card SPI I2C Keypad(5*5) Constant current sink GPIO ADC PCM SDIO

COMPONENTI AUSILIARI / *ANCILLARY EQUIPMENTS*		
Description	**Manufacturer**	**Model name**
RADIO TEST SET	R&S	CMW500

INTERFACE PORTS				
Port	**Description**	**Connection**	**Shielded**	**Cable length**
Enclosure	Conductive surface	Closed by screws	---	---
AC Power Port	Main Input	Input 230V 50/60Hz (Phase/Neutral with protective earth)	No	---
DC Power Port	Port not present			
Analogue/digital data ports	---	Port not present	No	<3m.
Wired Network port	Ethernet data line	RJ45 connector	Yes	>3mt
*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports				

OPERATING MODES	
#1	Equipment supplied at 230Vac 50Hz E-UTRA module allocated at channel 21100 (2535 MHz – Band 7) at max. power Channel bandwidth: 5MHz
#2	Equipment supplied at 230Vac 50Hz E-UTRA module allocated at channel 24300 (847 MHz – Band 20) at max. power Channel bandwidth: 5MHz
#3	Equipment supplied at 230Vac 50Hz E-UTRA module allocated at channel 27435 (725,5 MHz – Band 28) at max. power Channel bandwidth: 5MHz

Reference Document	Title of Document
ETSI EN 301 908-13 V.11.1.2	IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)
ETSI TS 136 521-1 (V12.7.0)	"LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing (3GPP TS 36.521-1 version 12.7.0 Release 12)".
ETSI TS 136 508 (V12.7.0)	"LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing (3GPP TS 36.508 version 12.7.0 Release 12)".
ETSI TS 136 101 (V11.14.0)	"LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (3GPP TS 36.101 version 11.14.0 Release 11)".

TESTS SUMMARY

RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 7 14

RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 20 21

RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 28 28

DECISION RULE

Statements of conformity (PASS or FAIL) to specifications are made in this report without taking measurement uncertainty into account.

Where statements of conformity are made in this report, the following decision rules are applied:
PASS – Results within limits/specifications

FAIL – Results exceed limits/specifications

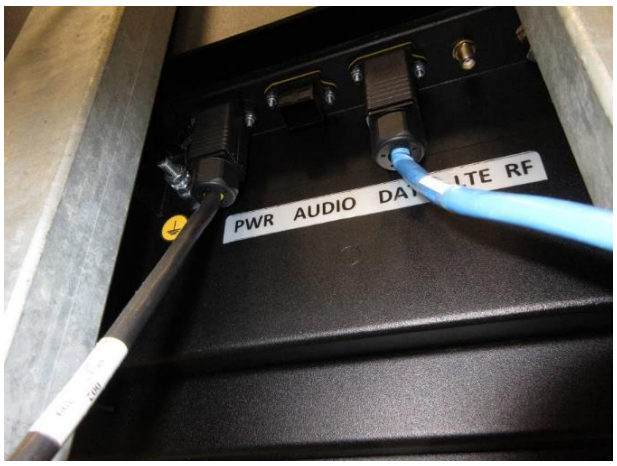
(emission test according to CISPR 16-4-2 cl.4.2, immunity tests TRI applies the disturbance level indicated in the product standard)

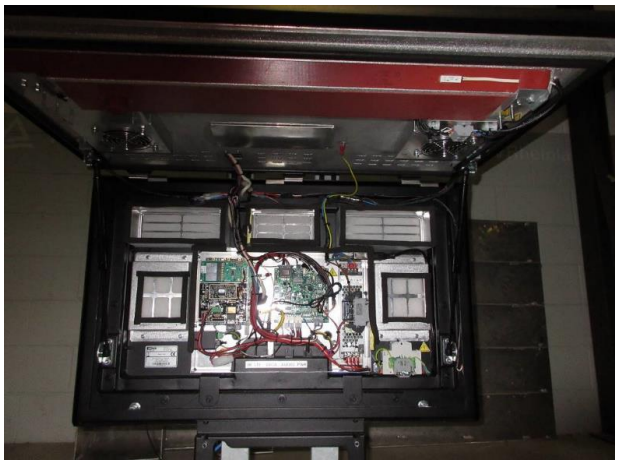
TESTS RESULTS			
No.	**Description**	**Mode**	**Results**
1	Radiated spurious emissions (UE)	MS allocated a channel, E-UTRA Band 7	COMPLIANT
2	Radiated spurious emissions (UE)	MS allocated a channel, E-UTRA Band 20	COMPLIANT
3	Radiated spurious emissions (UE)	MS allocated a channel, E-UTRA Band 28	COMPLIANT

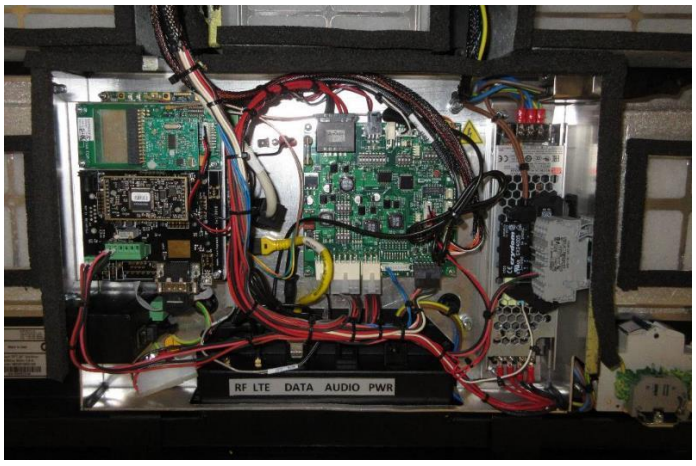
Legend:

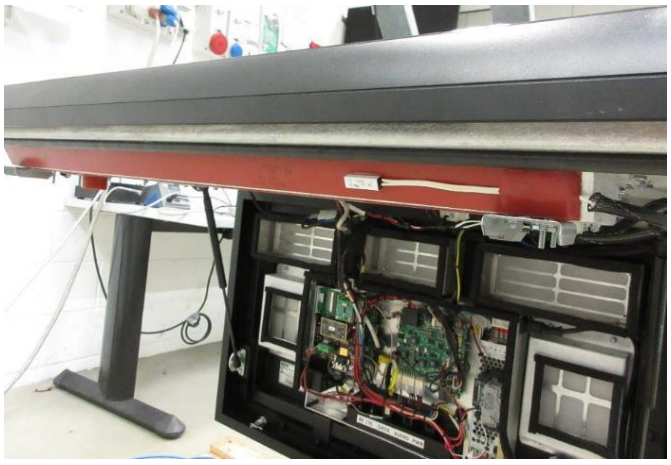
Pass = Result within the limits N/A = Not Applicable N/R = Not requested by the Client

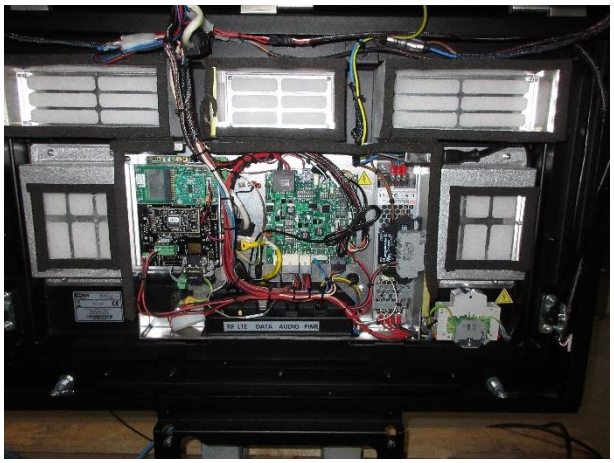
PHOTOGRAPHIC DOCUMENTATION

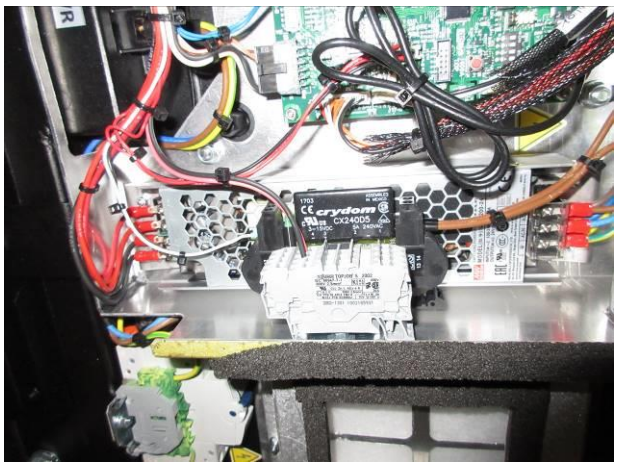

PWR AUDIO

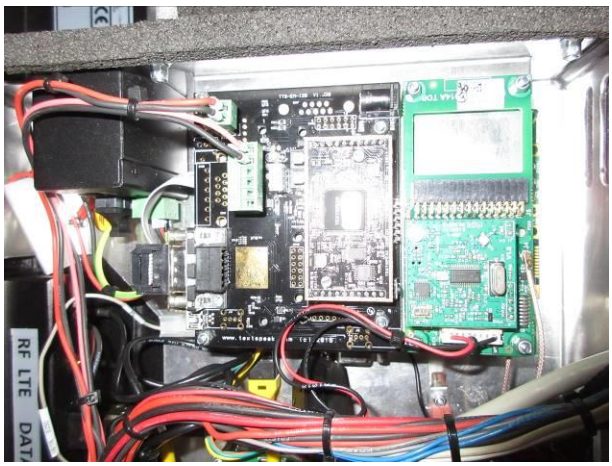



RF LTE DATA AUDIO PWR

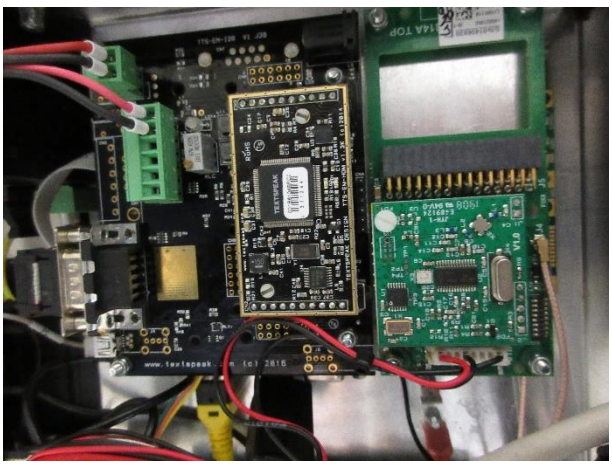





crydom
CX2405



UI2
UCHIYA
110C
3
164



Test N.1	**RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 7**

Reference Standard	ETSI EN 301 908-13 V.11.1.2
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348) ➢ Highpass Filter Wainwright instruments mod. whkx 10-2520-2800-180 (Inv. 2782704)
Measurement Uncertainty	Expanded uncertainty: (0 – 3,6) GHz: 2,7 dB (3,6 – 8) GHz: 3,1 dB (8 – 40) GHz: 3,7 dB Coverage probability: 95 % Coverage factor: 2,0

Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Method (Radiated – Integral Antenna)

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.
The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.4] and E-UTRA operating band requirement to address UE co-existence.
To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

Limits

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.
The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.
The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-6.
If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

Table 4.2.4.1.2-1: Δf_{OOB} boundary between E-UTRA channel and spurious emission domain

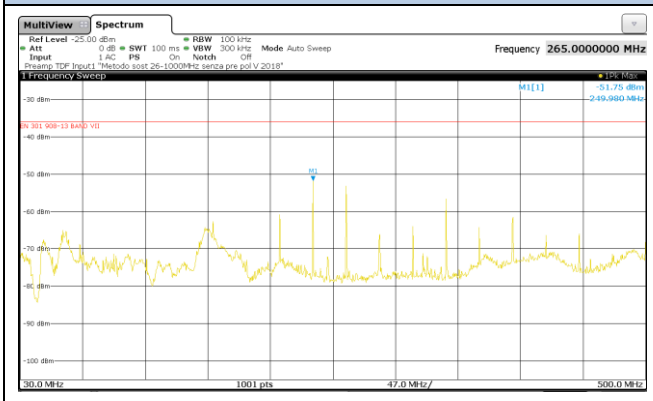
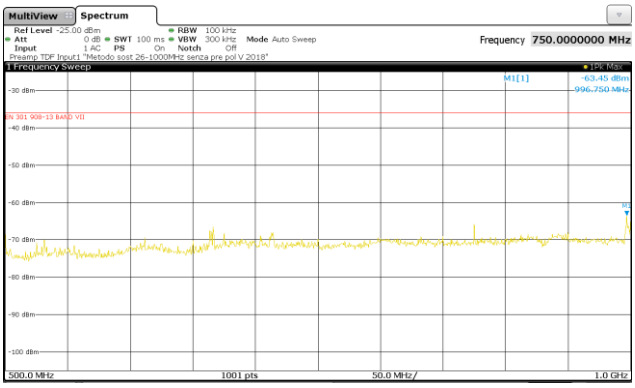
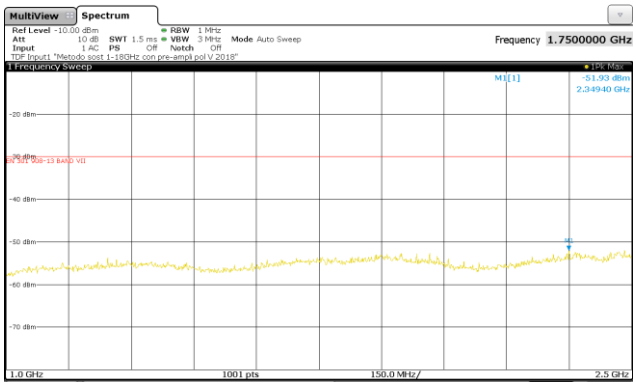
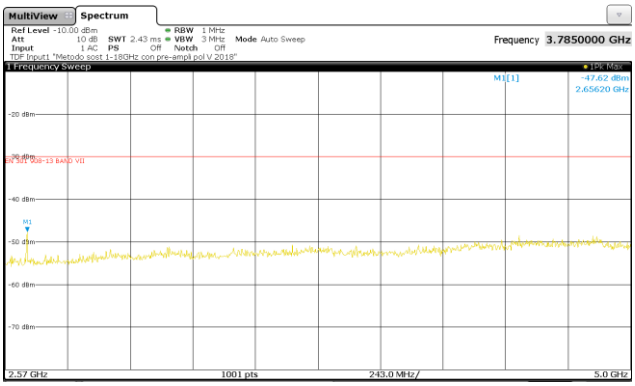
Channel bandwidth	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Δf_{OOB} (MHz)	2,8	6	10	15	20	25

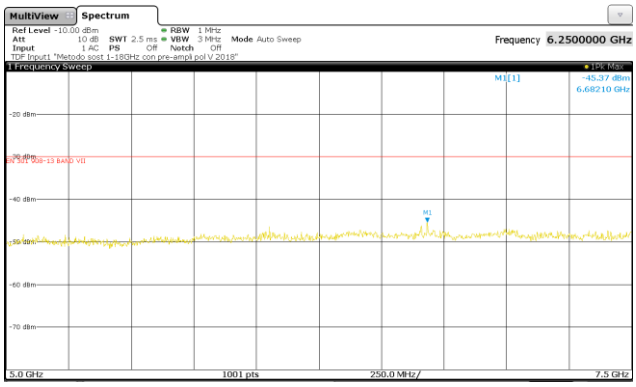
NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 4.2.4.1.2-2: General spurious emissions limits

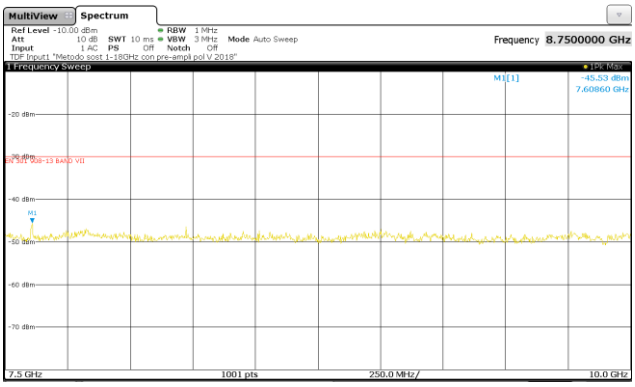
Frequency range	Maximum level	Measurement bandwidth	Comment
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz	
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1 000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12,75 GHz	-30 dBm	1 MHz	
12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	See note
NOTE: Shall apply for Band 22, 42 and Band 43.			

Normal test conditions			
E-UTRA Band 7	**Cabinet radiation (integrated antenna)**		**MS allocated a channel**
Channel: 21100	**Power control level: 3(23dBm)**	**Test temperature: 24°C**	**Voltage: 230V~ 50Hz**
Frequency range (MHz)		**RBW (KHz)**	**VBW (KHz)**
30-500		100	300
500-1000		100	300
1000-2500		1000	3000
2500-2570		Exclusion band	
2570-5000		1000	3000
5000-7500		1000	3000
7500-10000		1000	3000
10000-12750		1000	3000

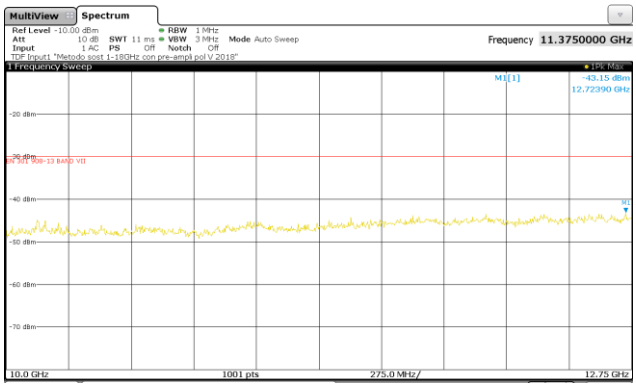
Vertical polarization	
E-UTRA BAND 7 Channel: 21100	
	
30-500 MHz	500-1000 MHz
	
1000-2500 MHz	2570-5000 MHz



5000-7500 MHz



7500-10000 MHz



10000-12750 MHz

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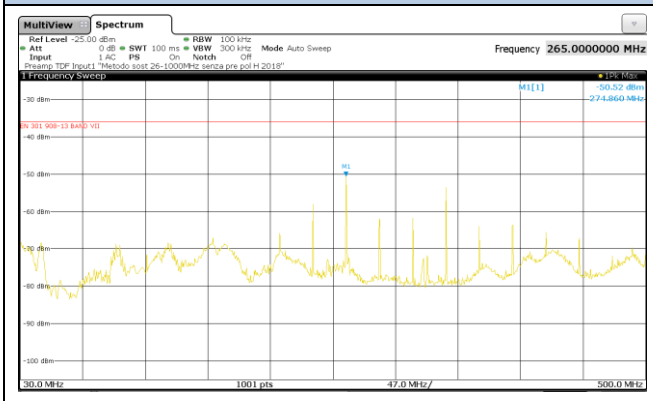
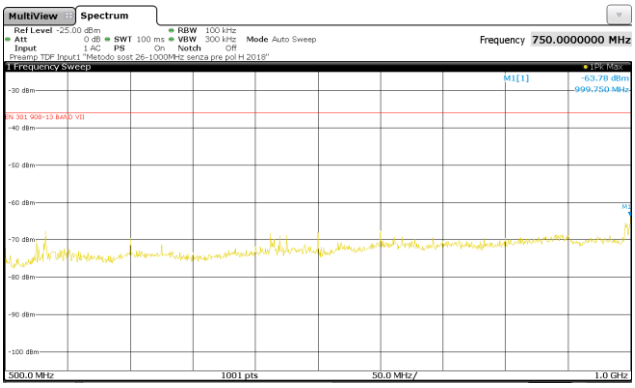
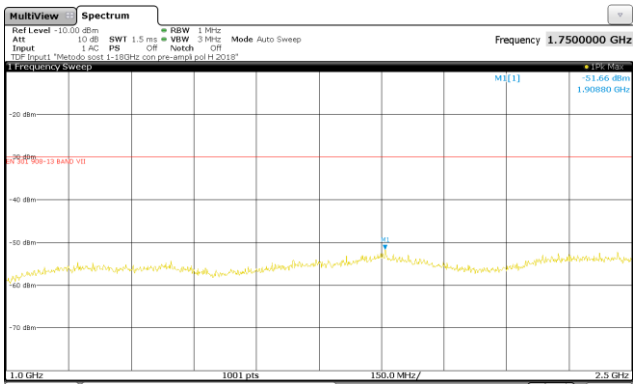
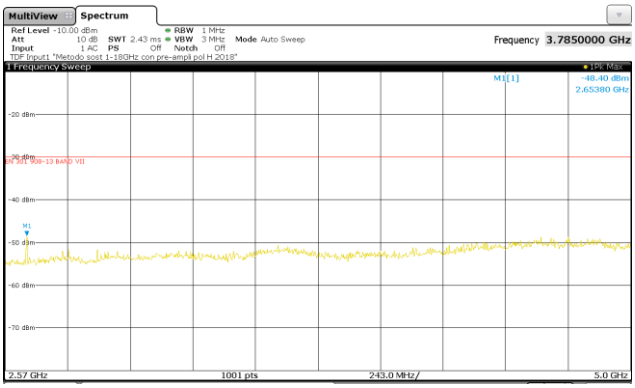
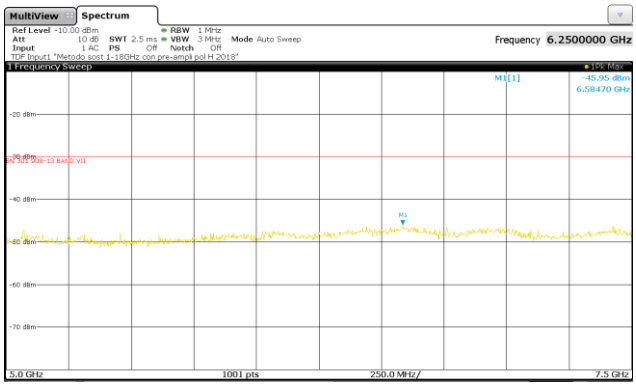
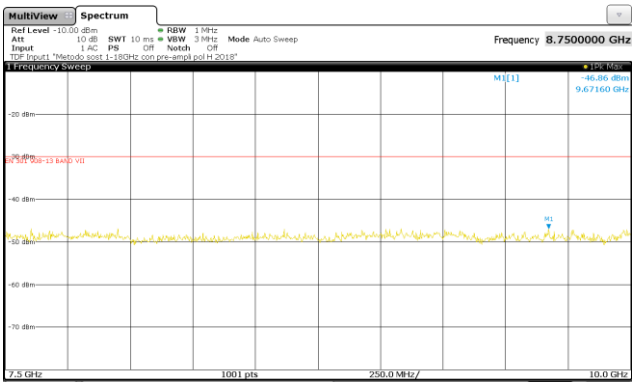
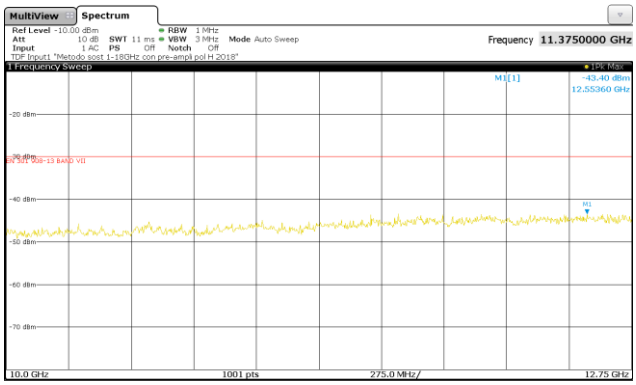
Horizontal polarization	
E-UTRA BAND 7 Channel: 21100	
	
30-500 MHz	500-1000 MHz
	
1000-2500 MHz	2570-5000 MHz



5000-7500 MHz



7500-10000 MHz



10000-12750 MHz

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Test N.2	**RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 20**

Reference Standard	ETSI EN 301 908-13 V.11.1.2
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348) ➢ Highpass Filter Wainwright instruments mod. whkx 10-1170-1300-150 (Inv. 2782705)
Measurement Uncertainty	Expanded uncertainty: (0 – 3,6) GHz: 2,7 dB (3,6 – 8) GHz: 3,1 dB (8 – 40) GHz: 3,7 dB Coverage probability: 95 % Coverage factor: 2,0
Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Method (Radiated – Integral Antenna)

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.
The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.4] and E-UTRA operating band requirement to address UE co-existence.
To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

Limits

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.
The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.
The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-6.
If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

Table 4.2.4.1.2-1: Δf_{OOB} boundary between E-UTRA channel and spurious emission domain

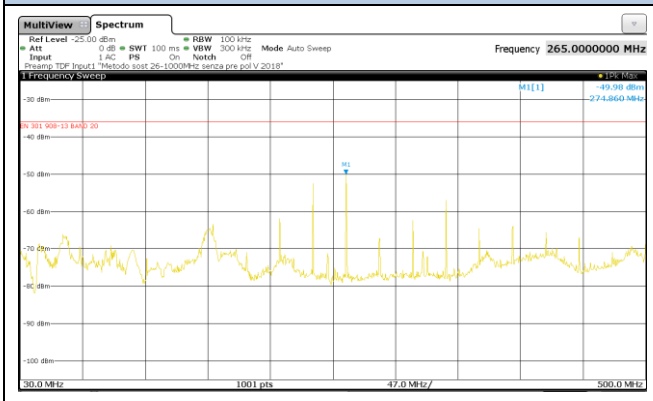
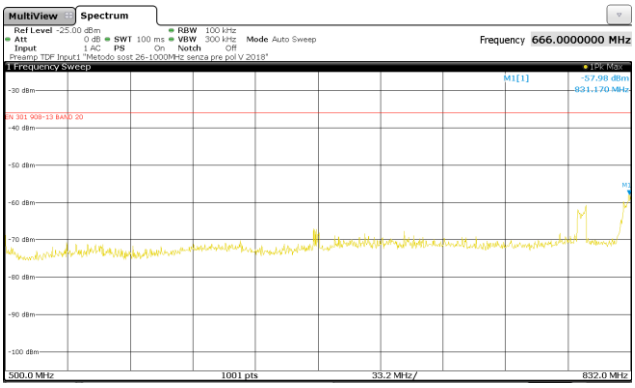
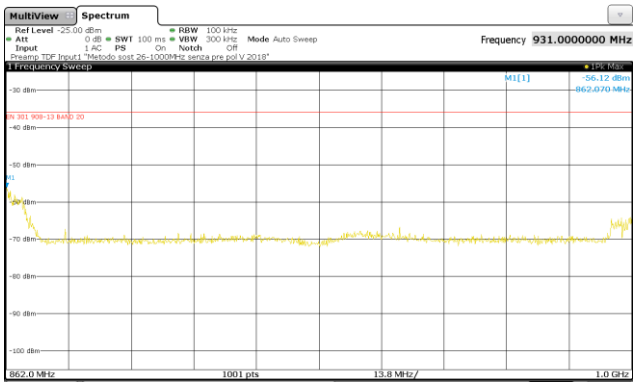
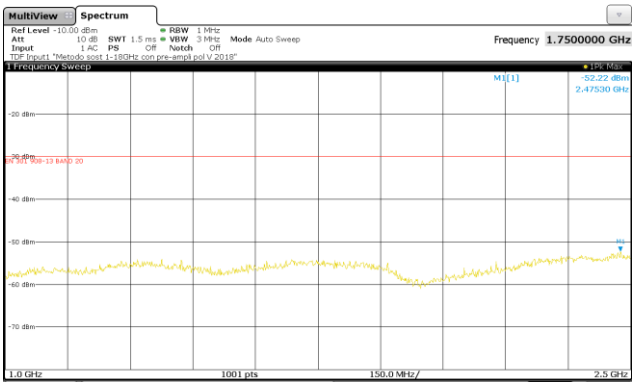
Channel bandwidth	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Δf_{OOB} (MHz)	2,8	6	10	15	20	25

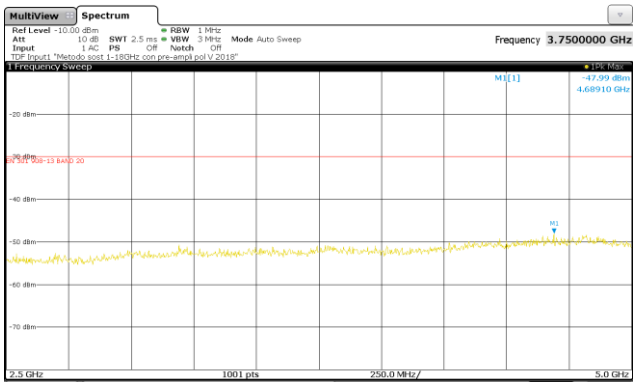
NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 4.2.4.1.2-2: General spurious emissions limits

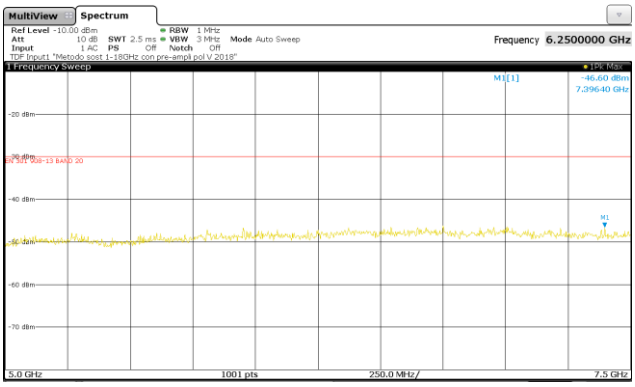
Frequency range	Maximum level	Measurement bandwidth	Comment
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz	
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1 000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12,75 GHz	-30 dBm	1 MHz	
12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	See note
NOTE: Shall apply for Band 22, 42 and Band 43.			

Normal test conditions			
E-UTRA Band 20	**Cabinet radiation (integrated antenna)**		**MS allocated a channel**
Channel: 24300	**Power control level: 3 (23dBm)**	**Test temperature: 24°C**	**Voltage: 230V~ 50Hz**
Frequency range (MHz)		**RBW (KHz)**	**VBW (KHz)**
30-500		100	300
500-832		100	300
832-862		Exclusion band	
862-1000		100	300
1000-2300		1000	3000
2300-5000		1000	3000
5000-7500		1000	3000
7500-10000		1000	3000
10000-12750		1000	3000

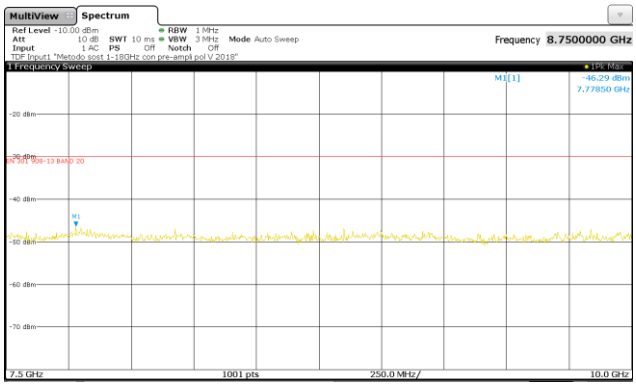
Vertical polarization	
E-UTRA Band 20 Channel: 24300	
	
30-500 MHz	500-832 MHz
	
862-1000 MHz	1000-2500 MHz



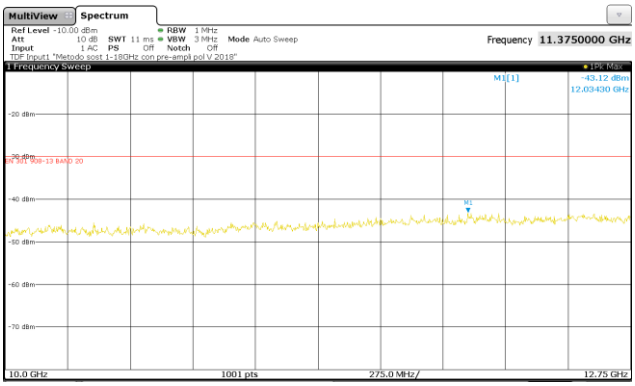
2500-5000 MHz



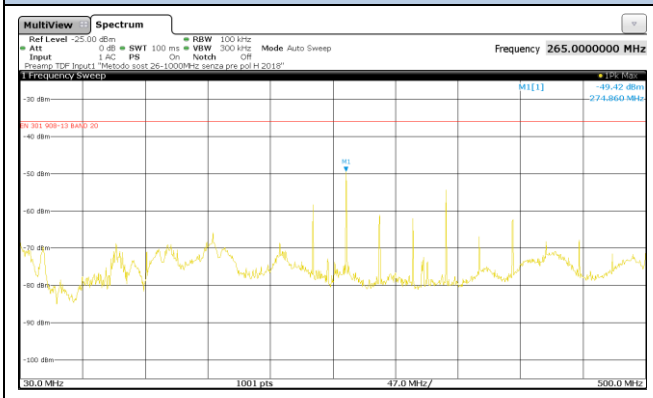
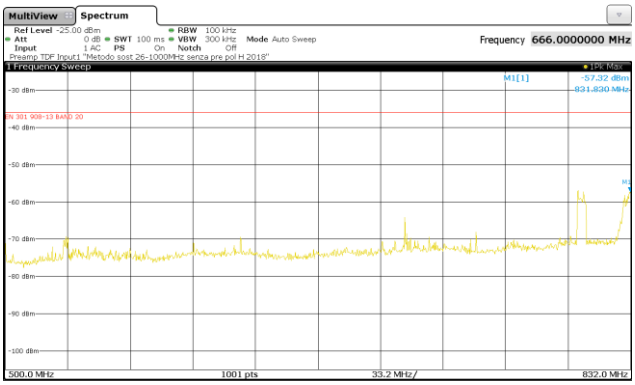
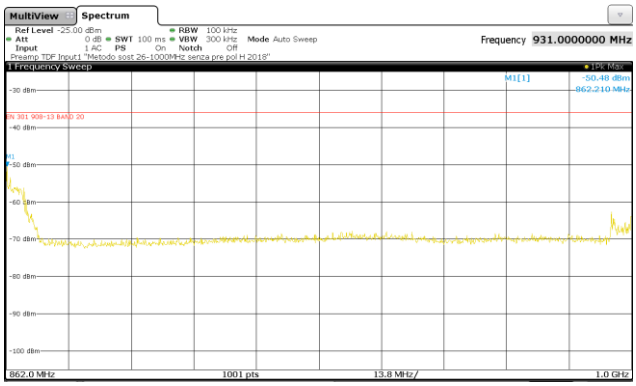
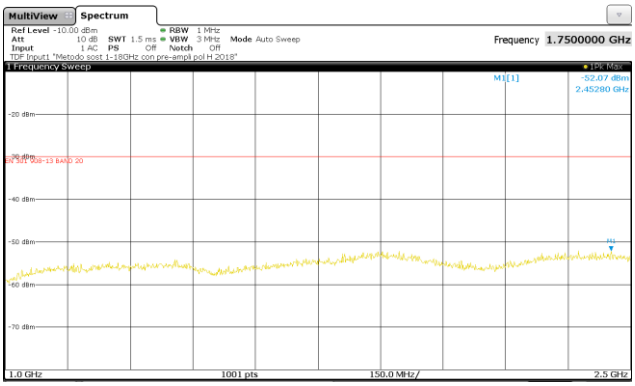
5000-7500 MHz

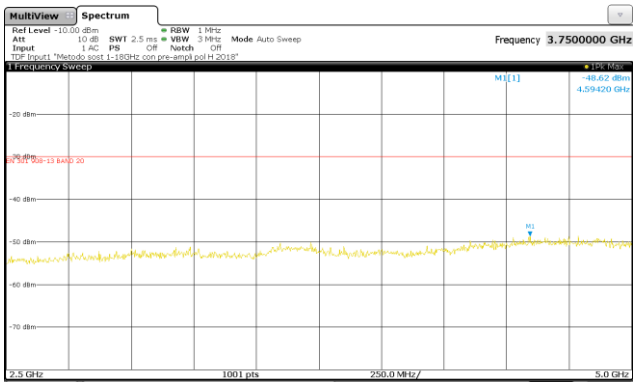


7500-10000 MHz

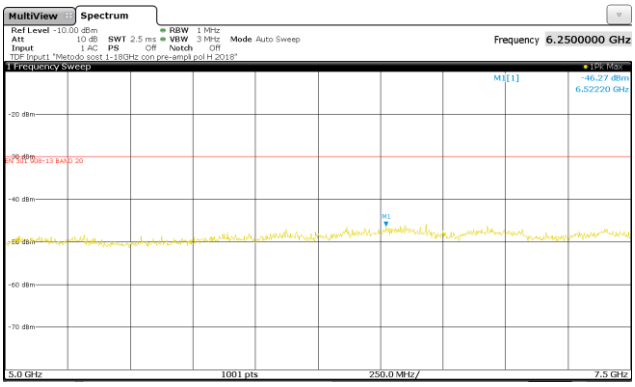


10000-12750 MHz

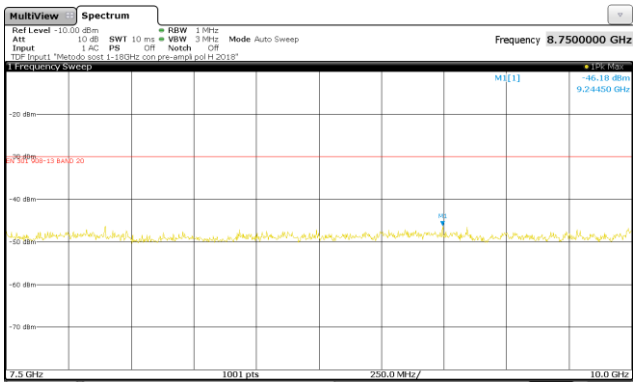
Horizontal polarization	
E-UTRA Band 20 Channel: 24300	
	
30-500 MHz	500-832 MHz
	
862-1000 MHz	1000-2500 MHz



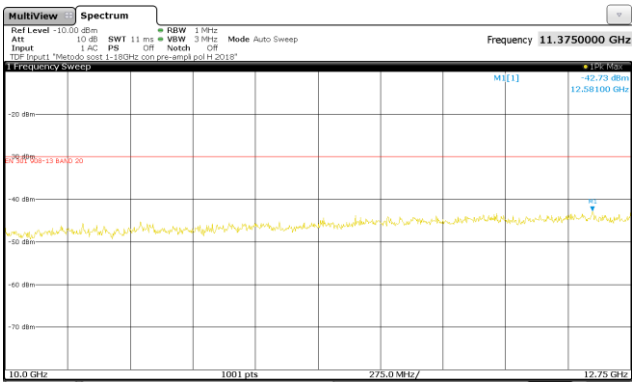
2500-5000 MHz



5000-7500 MHz



7500-10000 MHz



10000-12750 MHz

Test N.3	**RADIATED SPURIOUS EMISSIONS – MS ALLOCATED A CHANNEL, E-UTRA BAND 28**

Reference Standard	ETSI EN 301 908-13 V.11.1.2
List of reference equipment	➢ Semi-anechoic Chamber ETS-Lindgren mod.FACT3 (Inv. 2926063) ➢ Spectrum analyzer R&S mod. ESW44 (Inv. 2782867) ➢ Biconilog Antenna ETS Lindgren mod. 3142 (Inv. 2782348) ➢ Antenna Horn with preamplifier ETS-Lindgren mod. 3117-PA (Inv. 2782348) ➢ Highpass Filter Wainwright instruments mod. whkx 10-1170-1300-150 (Inv. 2782705)
Measurement Uncertainty	Expanded uncertainty: (0 – 3,6) GHz: 2,7 dB (3,6 – 8) GHz: 3,1 dB (8 – 40) GHz: 3,7 dB Coverage probability: 95 % Coverage factor: 2,0
Number of samples under test	1

Test Conditions	**Temperature**	**Relative Humidity**
Normal Temperature	15 to 35 °C	20% to 75%
Test Conditions	**Parameter**	**Measured**
Normal test source voltage	Mains voltage	Nominal ± 10%

Test Method (Radiated – Integral Antenna)

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.
The spurious emission limits are specified in terms of general requirements in line with Recommendation ITU-R SM.329-12 [i.4] and E-UTRA operating band requirement to address UE co-existence.
To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

Limits

The spurious emission limits in table 4.2.4.1.2-2 apply for the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth shown in table 4.2.4.1.2-1.
The measured average power of spurious emission for general requirements shall not exceed the described values in table 4.2.4.1.2-2.
The measured average power of spurious emission for E-UTRA operating band specific requirements to protected bands shall not exceed the described values in tables 4.2.4.1.2-3 and 4.2.4.1.2-6.
If a different test site or method is used, this shall be stated in the test report. The results shall be converted to the reference method values and the validity of the conversion shall be demonstrated.

Table 4.2.4.1.2-1: Δf_{OOB} boundary between E-UTRA channel and spurious emission domain

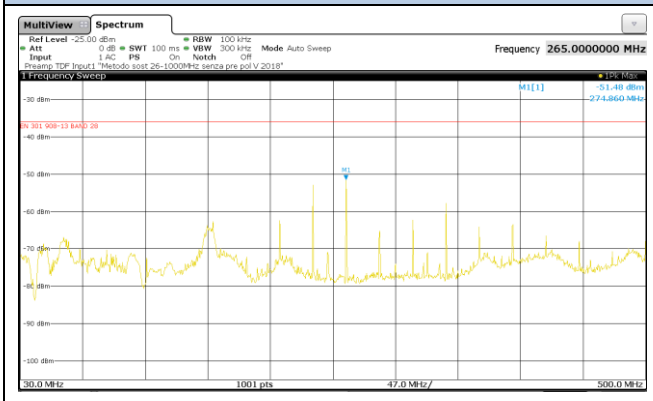
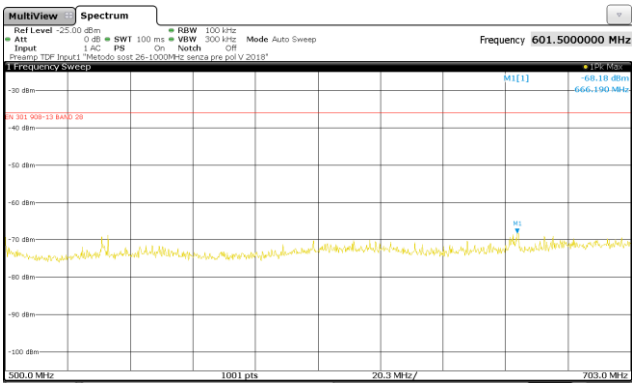
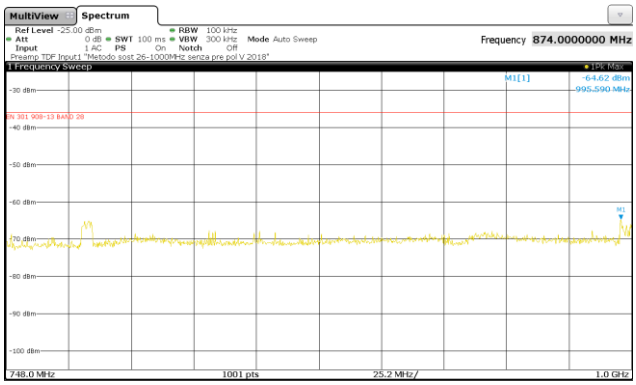
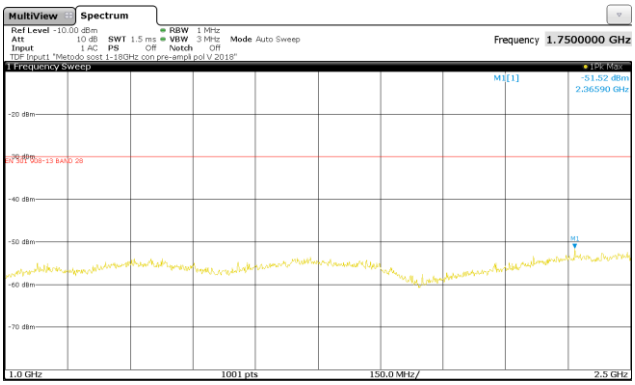
Channel bandwidth	1,4 MHz	3,0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Δf_{OOB} (MHz)	2,8	6	10	15	20	25

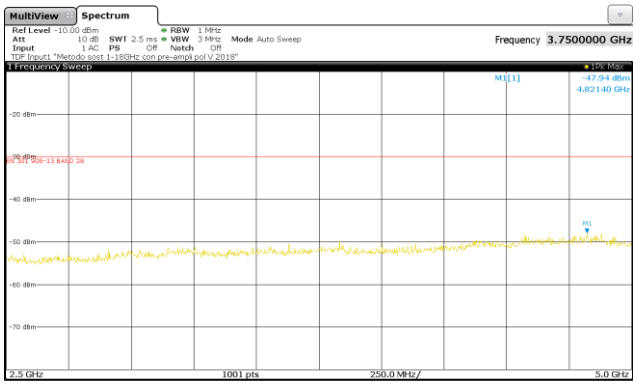
NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 4.2.4.1.2-2: General spurious emissions limits

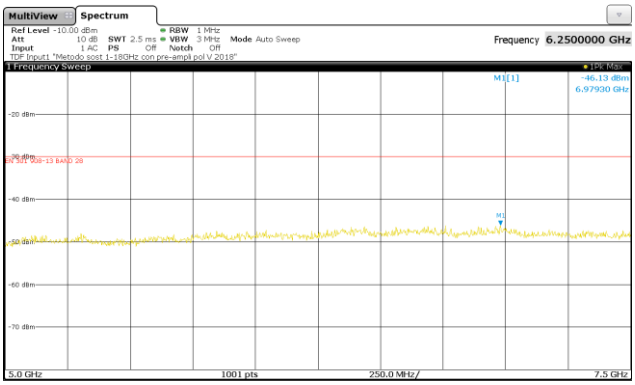
Frequency range	Maximum level	Measurement bandwidth	Comment
9 kHz ≤ f < 150 kHz	-36 dBm	1 kHz	
150 kHz ≤ f < 30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1 000 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12,75 GHz	-30 dBm	1 MHz	
12,75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	See note
NOTE: Shall apply for Band 22, 42 and Band 43.			

Normal test conditions			
E-UTRA Band 28	**Cabinet radiation (integrated antenna)**		**MS allocated a channel**
Channel: 27435	**Power control level: 3 (23dBm)**	**Test temperature: 24°C**	**Voltage: 230V~ 50Hz**
Frequency range (MHz)		**RBW (KHz)**	**VBW (KHz)**
30-500		100	300
500-703		100	300
703-748		Exclusion band	
748-1000		100	300
1000-2300		1000	3000
2300-5000		1000	3000
5000-7500		1000	3000
7500-10000		1000	3000
10000-12750		1000	3000

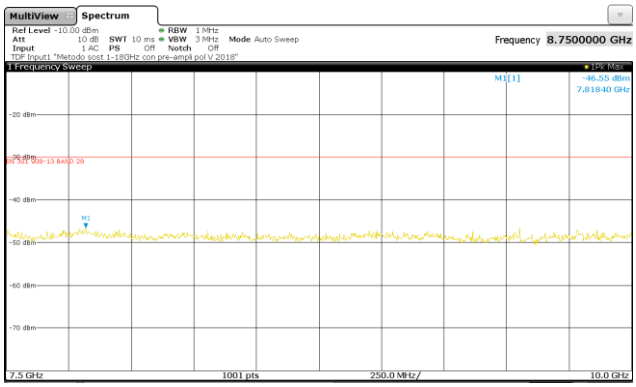
Vertical polarization	
E-UTRA Band 28 Channel: 27435	
	
30-500 MHz	500-703 MHz
	
748-1000 MHz	1000-2500 MHz



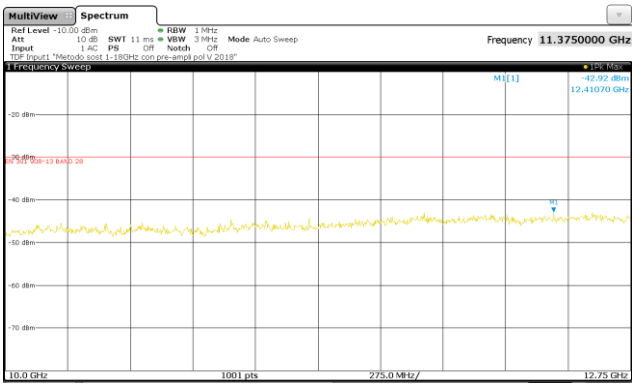
2500-5000 MHz



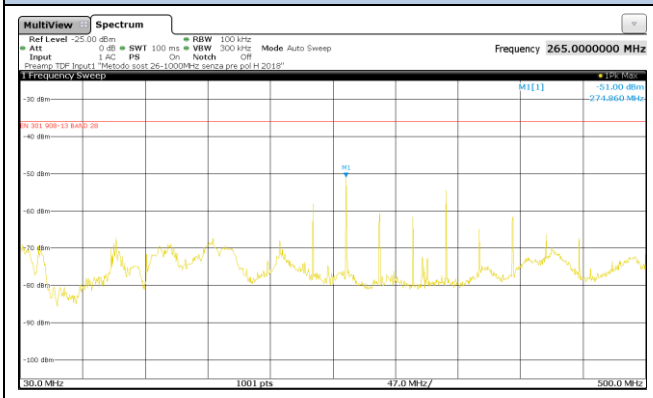
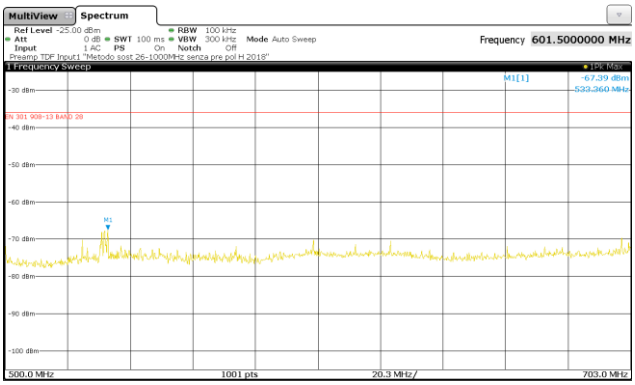
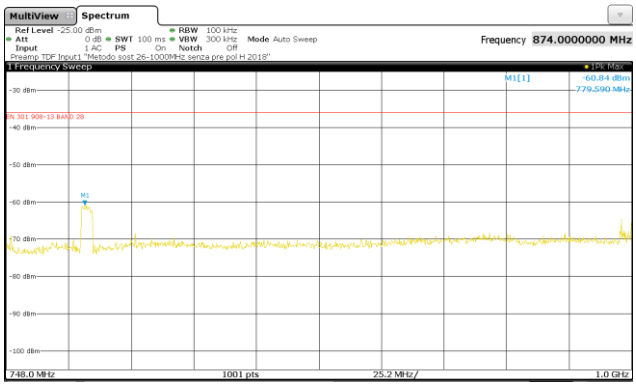
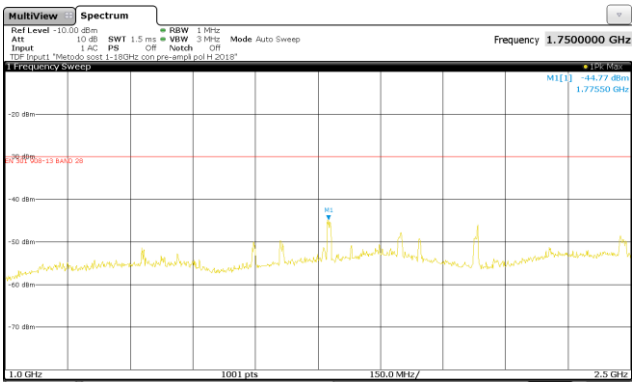
5000-7500 MHz

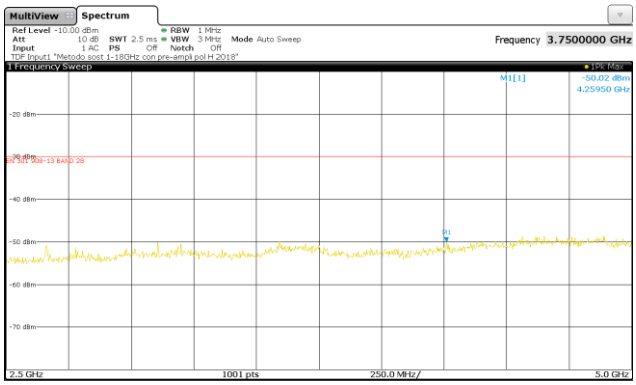


7500-10000 MHz

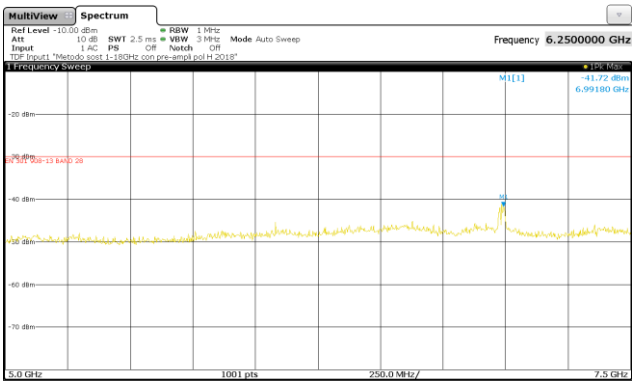


10000-12750 MHz

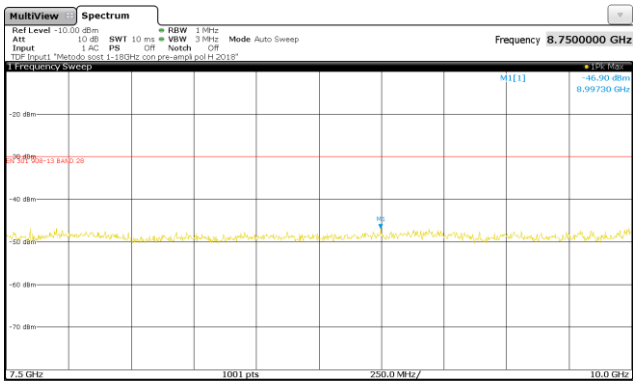
Horizontal polarization	
E-UTRA Band 28 Channel: 27435	
	
30-500 MHz	500-703 MHz
	
748-1000 MHz	1000-2500 MHz



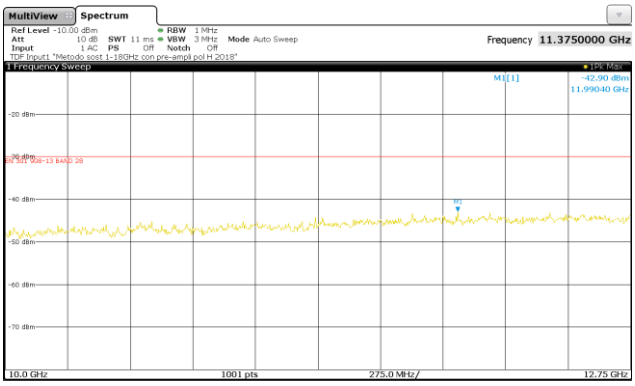
2500-5000 MHz



5000-7500 MHz



7500-10000 MHz



10000-12750 MHz

END OF TEST REPORT